

WHAT IS CLAIMED IS:

SUB A) 1. A picture decoding and display unit for decoding
predictively encoded pixel data of a picture included in a
supplied bit stream, restoring original pixel data for
outputting to a display unit for display thereon, said
5 picture being formed by pixel data of a frame having two
fields, said picture decoding and display unit comprising:

decoding means coupled to receive said bit stream,
for extracting said pixel data included in said bit stream
and carrying out said decoding processing on the extracted
10 pixel data to restore said original pixel data, said
decoding means including means for extracting information
indicating whether a type of said frame of the supplied
pixel data included in said bit stream is an I/P picture
employed as a reference picture in the decoding processing
15 or a B picture not employed as the reference picture but
subjected to only display, for identifying the type of
said frame;

memory means coupled to said decoding means for
storing the pixel data of said B picture restored by said
20 decoding means in accordance with a B picture
identification indication signal from said decoding means;

read means coupled to said memory means for reading
the pixel data stored in said memory means and outputting

the read out pixel data to said display unit for display;
25 and

control means coupled to said decoding means and said
read means for controlling operation timings of said
decoding means and said read means such that time
difference between a timing for starting said decoding
30 processing of a B picture and that for outputting the
restored pixel data of said B picture from said memory
means to said display unit through said read means is
substantially one field time required for outputting one
field pixel data of said B picture to said display unit.

2. The picture decoding and display unit in
accordance with claim 1, wherein said decoding processing
is carried out in units of blocks of the pixel data of
prescribed sizes on a screen, said picture including M
5 said blocks in a horizontal direction on said screen, and

Q said control means ~~further~~ includes delay means for
equivalently delaying said timing for starting said
decoding processing of said decoding means by a time
required for reading said pixel data of said M blocks from
10 said memory means.

3. The picture decoding and display unit in
accordance with claim 2, wherein said delay means includes

buffer memory means arranged between a pixel data output
part of said memory means and an output port of said read
5 means being coupled to said display unit, for storing
supplied said pixel data for a prescribed time.

4. The picture decoding and display unit in
accordance with claim 2, wherein said bit stream includes
data structure information indicating whether said pixel
data of said picture are supplied in a unit of a field or
5 in a unit of a frame including said pixel data of said two
fields in a mixed state, and

said decoding means includes extraction means for
extracting said data structure information from said bit
stream and designating a data structure indicated by said
10 data structure information,

said control means including means for inactivating
said delay means in response to indication of said units
of said fields by said data structure information supplied
from said extraction means.

5. The picture decoding and display unit in
accordance with claim 1, wherein said pixel data are
supplied in units of said fields.

6. The picture decoding and display unit in

accordance with claim 1, wherein said memory means is formed by a frame memory storing one frame worthy amount of pixel data.

7. The picture decoding and displaying unit in accordance with claim 2, wherein

said control means delays the start timing of decoding the pixel data of a B picture immediately

5 following another B picture.

~~SUB 8a~~ ✓ 8. A picture decoding and display unit for decoding predictively encoded pixel data of a picture included in an incoming bit stream, restoring original pixel data and outputting the restored original pixel data for display on

5 a display unit, said picture formed by a frame of a plurality of fields, said picture decoding and display unit comprising:

decoding means coupled to receive said bit stream, for carrying out said decoding processing on said

10 predictively encoded pixel data to restore said original pixel data;

storage means coupled to said decoding means, for storing said restored pixel data received from said decoding means;

15 read means coupled to said storage means, for reading

pixel data from said storage means for outputting said display unit for display thereon; and

control means coupled to said read means and said decoding means for making said decoding means start
20 decoding processing of pixel data of a frame supplied subsequently to a certain frame including a last field to be finally displayed in the certain frame in response to reading of said last field from said read means.

9. The picture decoding and display unit in accordance with claim 8, wherein said decoding processing is carried out in units of blocks of the pixel data of prescribed sizes on a screen, said picture including M
5 said blocks in a horizontal direction on said screen,

said control means further including delay means for delaying said timing for starting said decoding processing of said decoding means by a time required for reading said pixel data of said M blocks from said storage means.

10. The picture decoding and display unit in accordance with claim 9, wherein said delay means includes buffer memory means arranged between a pixel data output part of said storage means and an output port of said read
5 means coupled to said display unit, for storing the pixel data received from said storage means for a prescribed

time.

11. The picture decoding and display unit in accordance with claim 9, wherein said bit stream includes data structure information indicating whether said pixel data of said picture are supplied in a unit of the field
5 or in a unit of the frame including pixel data of two fields in a mixed state, and

said decoding means includes extraction means for extracting said data structure information from said bit stream and designating a data structure indicated by said
10 data structure information,

said control means including means for inactivating said delay means in response to indication of said units of said fields by said data structure information supplied from said extraction means.

12. The picture decoding and display unit in accordance with claim 8, wherein said pixel data are supplied in units of said fields.

13. The picture decoding and display unit in accordance with claim 8, wherein types of said frame of said picture include an I/P picture employed as a reference picture in the decoding processing and a B

5 picture not employed as the reference picture but
subjected to only display, said storage means includes a
frame memory storing pixel data of one frame as a storage
element for storing only said B picture pixel data.

✓ 14. A picture decoding and display unit for decoding
predictively encoded pixel data of a picture included in
an incoming bit stream, restoring original pixel data for
outputting to a display unit for display thereon, said
5 picture formed by a frame of a plurality of fields, said
picture decoding and display unit comprising:

decoding means coupled to receive the bit stream, for
receiving said predictively encoded pixel data and
carrying out said decoding processing to restore said
10 original pixel data for outputting;

memory means coupled to said decoding means for
storing the restored original pixel data outputted from
said decoding means;

read means coupled to said memory means, for
15 successively reading the pixel data stored in said memory
means in units of said fields for outputting said display
unit; and

control means coupled to said read means and said
decoding means for controlling said read means for again
20 reading the pixel data in a unit of a field every

prescribed number of said frames from said memory means in accordance with supplied pulldown conversion information and making said decoding means start decoding processing of pixel data of a next frame subsequent to a frame including a field to be read again in response to output of pixel data of a last field to be finally displayed among said fields of each frame from said memory means to said display unit.

15. The picture decoding and display unit in accordance with claim 14, wherein said control means includes:

means stopping said decoding processing by said decoding means for one field period being precedent to a display period for said last field to be finally displayed when the pixel data of said last field is again read from said memory means, said one field period being a time required for displaying pixel data of one field on said display unit.

16. The picture decoding and display unit in accordance with claim 14, wherein said decoding processing is carried out in units of blocks of pixel data of prescribed sizes on a screen, said picture including M said blocks in a horizontal direction on said screen, and

said control means further includes delay means for equivalently delaying said timing for starting said decoding processing by said decoding means by a time required for reading said pixel data of said M blocks from said memory means, with respect to transfer of pixel data to said display unit.

17. The picture decoding and display unit in accordance with claim 16, wherein said delay means includes buffer memory means arranged between a pixel data output part of said memory means and an output port of said read means coupled to said display unit, for storing supplied said pixel data for a prescribed time.

18. The picture decoding and display unit in accordance with claim 16, wherein said bit stream includes data structure information indicating whether said pixel data of said picture are supplied in a unit of a field or in a unit of a frame including the pixel data of two fields in a mixed state, and

said decoding means includes extraction means for extracting said data structure information from the bit stream and designating a data structure indicated by said data structure information,

said control means including means for inactivating

said delay means in response to indication of said unit of said field by said data structure information being supplied from said extraction means.

19. The picture decoding and display unit in accordance with claim 14, wherein said pixel data are supplied in units of said fields.

20. The picture decoding and display unit in accordance with claim 14, wherein types of said frame of said picture include an I/P picture employed as a reference picture in the decoding processing and a B picture not employed as the reference picture but subjected to only display, said memory means includes a frame memory storing pixel data of one frame as a storage element for storing only said B picture pixel data.

SUBA3 ✓ 21. A picture decoding and display unit for decoding predictively encoded pixel data of a picture included in a supplied bit stream, restoring original pixel data for outputting to a display unit for display thereon, said picture formed by a frame of two fields, said picture decoding and display unit comprising:

decoding means coupled to receive the bit stream, for carrying out said decoding processing on said predictively

encoded pixel data in the received bit stream to restore
10 said original pixel data;

storage means coupled to said decoding means, for
storing the restored pixel data received from said
decoding means;

read means coupled to said storage means, for reading
15 said pixel data from said storage means for outputting to
said display unit for display thereon; and

control means coupled to said read means and said
decoding means for starting reading of pixel data of a
first field of a frame to be displayed with a time
20 difference required for reading pixel data of one field
from said storage means in response to starting of the
decoding processing on the first field in said decoding
means.

22. The picture decoding and display unit in
accordance with claim 21, wherein said decoding processing
is carried out in units of blocks of pixel data of
prescribed sizes on a screen, said picture including M
5 said prescribed sizes of blocks in a horizontal direction
on said screen, and

a said control means ^{further} ~~further~~ includes delay means for
equivalently delaying said timing for starting said
decoding processing on a frame subsequent to the frame

10 including said first field of said decoding means by a
time required for reading said pixel data of said M blocks
from said storage means, with respect to the starting of
the reading of said storage means.

23. The picture decoding and display unit in
accordance with claim 22, wherein said delay means
includes buffer storage means arranged between a pixel
data output part of said storage means and an output port
5 of said read means coupled to said display unit, for
storing the pixel data received from said storage means
for a prescribed time.

24. The picture decoding and display unit in
accordance with claim 22, wherein said bit stream includes
data structure information indicating whether said pixel
data of said picture are supplied in a unit of a field or
5 in a unit of a frame including said pixel data of two
fields in a mixed state, and

said decoding means includes extraction means for
extracting said data structure information from the bit
stream and designating a data structure indicated by said
10 data structure information,

said control means including means for inactivating
said delay means in response to indication of the field

unit by said data structure information supplied from said extraction means.

25. The picture decoding and display unit in accordance with claim 21, wherein said pixel data are supplied in units of said fields.

26. The picture decoding and display unit in accordance with claim 21, wherein types for said frames of said pictures include an I/P picture employed as a reference picture in the decoding processing and a B picture not employed as the reference picture but subjected to only display, said storage means includes a frame memory storing pixel data of one frame as a storage element for storing only pixel data of said B picture.

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